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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,578	07/31/2003	Tien-Jen Cheng	FIS920030103US1	1577

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EXAMINER
HA, NATHAN W

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 10/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/604,578	CHENG ET AL.	
	Examiner	Art Unit	
	Nathan W. Ha	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 July 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) *1-13* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *14-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 14-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In this case, the newly added limitation, adhered in situ, renders new matter. Furthermore, it should be noted that the "in situ" is unclear. For the examination purposes, the Examiner presumes that the phrase means the pins are disposed on top of the other elements. And the "in situ appears to be a method of forming the element.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 21-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In this case, claim 21 recites, "connection members

are integral members". It is unclear what integral means. Does it mean the connection member and the pad are a one-piece element?

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 14-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (US 4,518,112, previously cited, hereinafter, Miller) and in view of Oh et al. (US 2004/0134974, previously cited, hereinafter, Oh.)

In regard to claim 14, in fig. 1, Miller discloses an electrical structure comprising:

a first set of contacts 16 in an electrical structure;

at least one interface layer 18 adhering to the set of contacts;

a set of pads 24 disposed over the set of contacts and including the interface layer;

a set conductive pins 14 adhering directly to said pads, fig. 2;

a barrier layer, not numbered, adhering to all exposed surfaces of the pin; and a layer of metal surrounding the barrier layer.

Miller, however, does not expressly disclose that the surrounding layer is made of solder. It should be noted that solder is also a conductive layer. It is widely used for electrical connection since it is inexpensive compared to gold, and it is easier to form

since it requires lower melting temperature. For instance, Oh discloses an electrical connection structure including metal layer as seed layer and adhesive 406 and 407, pin 411, and solder 405 is disposed over the pin in order to protect the pin and provide electrical connections to external devices. See also, fig. 4a.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to substitute solder layer as taught by Oh in order to fully take the advantage as mentioned.

It should be further noted that, even though Miller show the pin in a singular form, but it would be understood that a connection structure requires more than one pin.

The above combination does not explicitly teach that the conductive pins are adhered in situ. However, the limitation "in situ" in claim 14 is taken to be a product by process limitation; it is the patentability of the claimed product and not of recited process steps which must be established. Therefore, when the prior art discloses a product which reasonably appears to be identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. A product by process claim directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See In re Fessman, 180 USPQ 324,326(CCPA 1974); In re Marosi et al., 218 USPQ 289,292 (Fed. Cir. 1983); and particularly In re Thorpe, 227 USPQ 964,966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a "product by process " claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old or obvious product

produced by a new method is not a patentable product, whether claim in "product by process" claim or not.

In regard to claim 15, Miller further shows that the metal barrier is capable of blocking passage of metal from the pin since it is made of different material.

In regard to claims 16 and 17, Miller discloses the interface layer is made of Nickel. Nickel is known and capable as a seed and adhesive material. See also, col. 4, lines 4-5.

In regard to claim 20, Miller discloses that the Au layer 20 is formed on the barrier layer. See also, col. 4, lines 1-4.

In regard to claims 18-19, Miller does not disclose that the seed layer is made of TiW. The seed layer in Miller may be substituted by TiW since this compound provides a better adhesion and higher electrical connectivity, also, stronger bonding between layers. See paragraph [0028].

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to substitute TiW layer as taught by Oh in order to fully take the advantage as mentioned.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 21-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Chow et al. (US 6,413,851, newly cited, hereinafter, Chow.)

In regard to claim 21, in fig. 1, Chow discloses an electrical structure comprising:

a plurality of contacts 4 positioned on a top surface of said electrical structure, wafer 2;

first and second interface layers 8 (see also col. 4, lines 1-10, wherein a second layer is described) positioned on said plurality of contacts. These layers include a plurality of pads in electrical communication with said plurality of contacts;

and a plurality of electrical connection members 12 plated directly onto said contacts, wherein said plurality of electrical connection members is integral members of said plurality of pads.

In regard to claim 22, Chow further discloses a barrier layer 14 positioned about a first surface of the plurality of electrical connection members. See also fig. 1j.

In regard to claim 23, Chow further discloses a layer of solder material 16' positioned about the barrier.

In regard to claim 24, the barrier is capable of adapting for containing electrical connection members.

In regard to claims 25 and 27, the interface layers are adhesive and wetting layers. See also col. 4, lines 1-14.

In regard to claim 26, the layers are made of TiW, Cr, etc. See also, col. 4, lines 5-7.

In regard to claim 28, Chow further discloses that the wetting layer is made of Cu, Au. See also, col. 4, lines 6-8.

Response to Arguments

9. Applicant's arguments filed 7/19/06 have been fully considered but they are not persuasive. For instance, the Applicants simply argue that the cited references do not teach the pins adhered in situ. This newly added limitation is a new matter limitation and it is not clearly defined in the original specification as filed. As mentioned above, it appears to be a product-by-process limitation, which is not given patentable weight in a product claim. The Applicants give no further arguments regarding to newly added claims, claim 21-28.

Conclusion

10. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

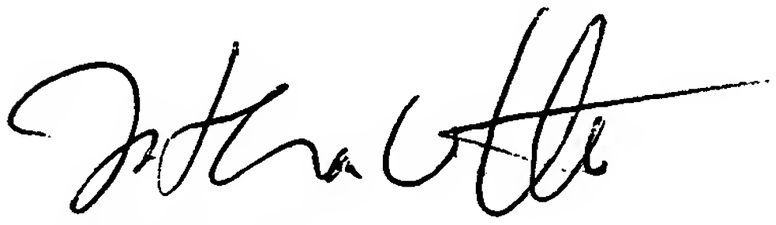
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan W. Ha whose telephone number is (571) 272-1707. The examiner can normally be reached on M-TH 8:00-7:00(EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



/Nathan Ha/
September 19, 2006